

ABSTRACT

[0154] A method and system for generating modulated optical vortices. Optical vortices can be used for a variety of applications, such as applying controlled torque or controlled force patterns to objects from a few nanometers to hundreds of micrometers in size. Numerous optical modes of optical vortices can be created to meet virtually any desired need in manipulating of objects. Furthermore, one can modify the wavefront of a beam of light in a specific way to create a new type of optical trap useful for manipulating mesoscopic materials. When the modified beam is brought to a focus, the resulting optical trap exerts forces transverse to the optical axis that can be used to transport mesoscopic matter such as nanoclusters, colloidal particles, and biological cells.